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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Toshiaki Mizoguchi

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EXAMINER

SHEVIN, MARK L

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/521,950	<b>Applicant(s)</b> MIZOGUCHI ET AL.	
	<b>Examiner</b> Mark L. Shevin	<b>Art Unit</b> 4116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06-Sept-2005 and 19-Aug-2005</u> .                            | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Status:***

1. Claims 1-9, filed 21 January 2005 as part of a preliminary amendment, are pending

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "fewer alumina clusters" in claims 1-9 is a relative term which renders the claim indefinite. The term "fewer alumina clusters" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The word "fewer" has no definite meaning until it is quantified or qualified with respect to something else.

In the absence of a clear standard of comparison, the term "fewer alumina clusters" is interpreted as meaning that the claimed steel product has some form of alumina present but has clusters fewer in number than a steel that has not been treated with a REM, including the possibility of no clusters in the steel product.

Furthermore, in claims 1 and 2, the terms "consisting mainly of" and "consisting principally of", respectively, are relative terms which render these

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claims indefinite. 'Mainly' and 'principally' are not tied to a quantity and instead appear to be a reference to the importance of the oxides involved. See MPEP 2173.05(b), particularly:

When relative terms are used in claims wherein the improvement over the prior art rests entirely upon size or weight of an element in a combination of elements, the adequacy of the disclosure of a standard is of greater criticality.

In the absence of clarification in the specification, the Examiner interprets these claim phrases as meaning "comprising."

With respect to claim 1 in particular, the Examiner interprets the 0.5-15 mass% range limitation as applying to the concentration of REM-oxides present in alumina inclusions/clusters (Spec p. 7, lines 12-35).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**Claims 1-3, and 8-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nakato** (US 6,120,578).

Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process, *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966(Fed. Cir. 1985).

The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product, See e.g., *In re Garnero*, 412 F. 2d 276, 279, 162 USPQ 221, 223 (CCPA 1979).

Regarding claim 1, Nakato teaches a method of producing an alumina-cluster free (column 1, line 67) Al-killed (deoxygenated) steel product by adding Al and REM (rare earth metal, in particular Ce and La; column 2, lines 43-44) to a molten steel. The alumina concentration should be in the range of 30-85% (column 3, lines 28-30) and this allows one to include REM-oxides in the range of 0.5-15 mass% along with other minor oxides such as MgO and CaO (column 3, lines 50-55; and column 4, line 46). The amount of REM-oxides is discussed as being important in controlling the shape of the oxide and subsequent formation of clusters (column 3, lines 12-15). Furthermore, the ratio of REM to Al should be controlled to regulate the oxides formed and allow for separation (column 3, lines 22-25). The deoxygenation method is applied towards a steel with an alloy composition with C, Mn, P, and S elements in the range of claim 4.

Nakato does not explicitly teach the composition of the clusters by individual oxide compound concentration (i.e. X% Alumina and Y% REM-oxide,

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only X% alumina). It would have been obvious to one of ordinary skill in the metallurgical arts at the time of the invention, taking the teachings of Nakato as a whole, to produce the claimed amount of REM-oxide as Nakato suggests that the cluster composition can be changed ("adjust the concentration", column 3, lines 27-31) and sets out guidelines for the composition indicating that it effects the final properties of the cluster and thus teaches the cluster composition and implicitly the REM-oxide amount (column 3, lines 12-15) as important in the formation of inclusions. One of ordinary skill could then optimize the cluster composition and thus the REM-oxide mass percentage to achieve the claimed range.

Regarding claim 2, Nakato further suggests that the total oxygen level can be adjusted first by conventional agitation under vacuum methods to yield an oxygen level that can be subsequently changed by the composition of the deoxygenation alloy (column 3, lines 55-67). Nakato also teaches the relationship between REM concentration and oxygen activity in Fig 1.

Nakato does not explicitly teach a ratio of total REM to total oxygen (T.O.) that meets the claimed range of 0.05 – 0.5. However it would have been obvious to one of ordinary skill in the metallurgical arts at the time the invention was made, given the teachings of Nakato as a whole to alter either the total REM content or total oxygen content as Nakato teaches the oxygen activities of the most active metal species including the REM, cerium, as a function of metal concentration (Fig 1) and one of ordinary skill would see that the oxygen content

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is a result effect variable that can be optimized as with the REM-oxide concentration.

Regarding claim 3, example 3 discloses a total REM content of 0.4 ppm and a total oxygen content of 18 ppm (column 4, lines 48-65). The dissolved REM content will inherently be less than 1 ppm as the total REM content is only 0.4 ppm.

Regarding claims 8 and 9, Nakato teaches that the prior art methods are insufficient in reducing alumina cluster diameters to below 100 microns, which causes problems with steel sheets for automobiles (column 1, line 55-63). Nakato then mentions that his invention solves this aforementioned problem and one would infer that Nakato therefore creates inclusions/clusters with diameters less than 100 microns. Indeed Nakato claims that *no* alumina clusters are formed.

**Claims 4-7** (*relying on claims 1 and 3 in particular as the broadest of the independent claims in the in this case*) are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nakato** (US 6,120,578) in view of **Nabeshima** (EP 0,906,960 A1).

What Nakato taught was discussed in the 103 rejection to claims 1-3, 8-9 above, however Nakato did not teach a steel with a composition that meets all limitations of claims 4-7.

Nabeshima is analogous art in that it is directed to the similar goal of minimizing cluster defects in steels and ensuring that continuous casting nozzles do not clog and accomplishes this by Ti-killing with REM additions (Abstract).

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Nabeshima goes into detail teaching the concentration of individual elements in the inventive alloy (page 7, lines 31-54)

Nb, B, Mo improve deep drawability and tensile strength [claim 5, 6, and 7]

Ni, Cu, and Cr may be added to improve corrosion resistance [claim 5]

See alloy No. 3 in Table 1 (pages 8 and 9) with concentrations of C, Si, Mn, P, S, Al, and total oxygen (T(O)) in the ranges of claim 4 and Ti in the range of claim 6.

It would have been obvious to one of ordinary skill in the art at the time of the invention, taking the teachings of Nakato and Nabeshima as a whole, to combine the two references to produce a steel alloy of claims 4-7 as both references are drawn to the same problem of minimizing inclusions/clusters that can, in particular, lead to surface defects that ruin the appearance of sheet metal for use in automobiles (Nabeshima, page 2, lines 24-28; Nakato, column 1, lines 22-28). Furthermore, this is the same problem (page 4, line 30 to page 5, line 5) being addressed by the instant application in reducing alumina clusters (surface slivers in steel sheets used for automobiles is specifically mentioned). One would have a reasonable expectation of success in combining Nakato with Nabeshima as both Nakato (column 1, lines 5-8) and Nabeshima (Abstract, paragraph 0001) are successful in reducing or eliminating alumina clusters. One of ordinary skill could optimize the ranges of the alloying elements disclosed by Nabeshima to produce the alloy of claims 4-7.

### ***Conclusion***

- Claims 1-9 are rejected
- No claims are allowed



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6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following are US patents relating to the use of rare earth metals in killing steel:

- a. Knapp: US 2,980,529
- b. Young: US 3,623,862
- c. Thomas: US 4,042,381
- d. Staggers: US 4,440,568
- e. Kokubo: US 4,880,480
- f. Ohmori: US 6,344,093

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mark L Shevin  
Examiner  
Art Unit 4116

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**/Vickie Kim/  
Supervisory Patent Examiner, Art Unit 4116**